

# A Focus on Fractions: Deepening Understanding and Decreasing Anxiety

## Alabama Council of Teachers of Mathematics Fall Forum

Sue O'Connell  
Nov. 15, 2024

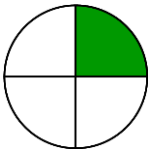
### Understanding Fractions and Fraction Notation

#### Step Back and Let Them Think

What part of this circle is shaded green?

"a fourth"

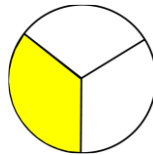
$$\frac{1}{4}$$



Turn and talk:  
What do you think each number represents? Explain your thinking.

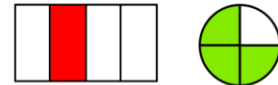


What fraction would you write to show the part of this circle that is shaded yellow?  
Explain the numbers in your fraction.



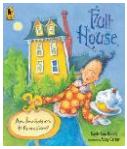
#### Try More Examples

Think about the colored sections of each shape.

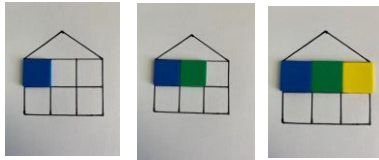


Write the fraction that shows the part that is colored?  
What does each number in your fraction show?

### Read *Full House* by Dayle Ann Dodds

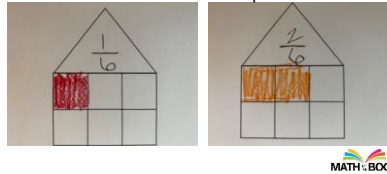


#### Visualizing Fractions during the Read Aloud



#### What fraction of the inn is filled?

- Color in the houses. Record the fraction in the roof.
- What does the numerator represent?
- What does the denominator represent?



### Exploring Number Lines as a Fraction Model

#### Consider Context

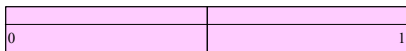
How would you model this?

Katie walked  $\frac{1}{2}$  mile to school.

How might you show that?

#### Exploring with Sentence Strips

Label the ends of a sentence strip 0 and 1.



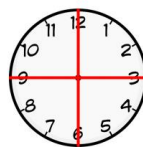
Fold the sentence strip to show  $\frac{1}{2}$

Colin ran  $\frac{1}{4}$  mile? Show how far he ran.

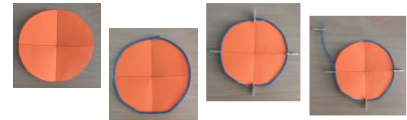
Diane ran  $\frac{3}{4}$  mile? Show how far she ran.



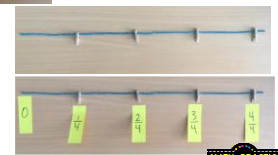
#### Connecting Area Models to Length/Measurement Models



#### Connecting Fraction Models

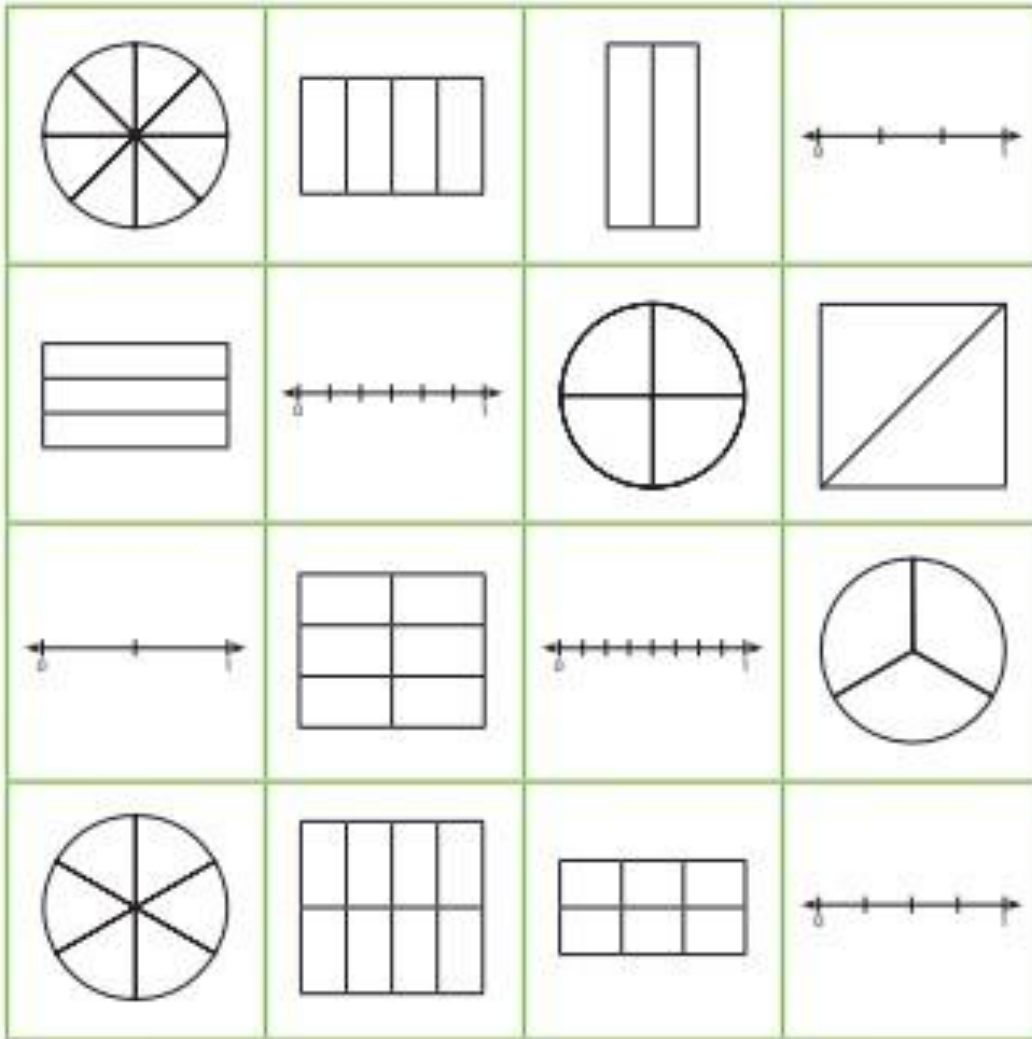


What do you notice?  
How is the fraction number line like the circle model?



Try a center task from *Navigating Numeracy Learning Progression Centers* (hand2Mind, 2024):

## Fraction Four in a Row



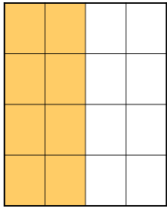
0 $\frac{1}{2}$	1 $\frac{1}{3}$	2 $\frac{1}{4}$	3 $\frac{1}{6}$	4 $\frac{1}{8}$
5 $\frac{2}{2}$	6 $\frac{2}{3}$	7 $\frac{3}{4}$	8 $\frac{4}{6}$	9 $\frac{5}{8}$

Navigating Numeracy: Developed by Sue O'Connell: Fraction Four in a Row Game Board

hand2mind.com

# Exploring Equivalence

## Paper Folding



How would you describe one side of your paper?  
Has the size of  $\frac{1}{2}$  of your paper changed?

$$\frac{1}{2} = \frac{2}{4} \quad \frac{1}{2} = \frac{4}{8} \quad \frac{1}{2} = \frac{8}{16}$$

## Discussions Following Paper Folding

Has the size of  $\frac{1}{2}$  of your paper changed?

Has the name for half of your paper changed?

$$\frac{1}{2} = \frac{2}{4}$$
$$\frac{1}{2} = \frac{4}{8}$$
$$\frac{1}{2} = \frac{8}{16}$$

Can you use your data to develop a definition of equivalent fractions?

## Comparing Fractions

**Compare to  $\frac{1}{2}$**  - Center task from Navigating Numeracy (hand2Mind)

- Roll and make a fraction less than or equal to 1.
- Tell your partner if your fraction is less than, equal to, or greater than  $\frac{1}{2}$ .
- Write your fraction in the correct section of the work mat.
- Check your thinking with a model.
- The first one to get five fractions less than  $\frac{1}{2}$  wins.

Compare to  $\frac{1}{2}$

less than $\frac{1}{2}$	equal to $\frac{1}{2}$	greater than $\frac{1}{2}$

0  $\frac{1}{2}$  1

## More on Comparing Fractions

Read *Sweet Potato Pie* by Kathleen Lindsey

### Explore: Comparing Pie Ingredients

After Sadie and Jake's accident with the flour, Mama had 3 bags of flour that were almost empty.

Bags of Flour  
 Bag 1 has  $\frac{5}{8}$  cup  
 Bag 2 has  $\frac{3}{4}$  cup  
 Bag 3 has  $\frac{2}{3}$  cup



What do you notice?

Mama wondered which bag had the least flour. Talk with a partner to decide.

Be ready to prove your answer with a model or something you know about fractions.

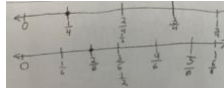
### More Explorations

Jake and Martha helped milk Lizzy. They decided to play a game to see who would get the most milk from Lizzy.

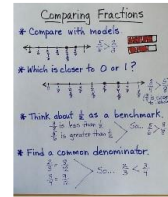
Jake got  $\frac{1}{4}$  bucket of milk.

Martha got  $\frac{2}{6}$  bucket of milk.

Who won? Prove your answer.



### Exploring Varied Strategies for Comparing Fractions



## Adding and Subtracting Fractions with Like Denominators

Read *Enemy Pie* by Derek Munson

### Investigate

Dad cut the enemy pie in sixths. Show it with your pattern blocks.



Dad ate 2 sixths of the pie and Jeremy ate one sixth of the pie. How many sixths did they eat?

2 sixths + 1 sixth = \_\_\_\_\_

Mathematicians don't write out the words like we did. Turn and share how a mathematician would write this.

$$\frac{2}{6} + \frac{1}{6} = \frac{3}{6}$$

Pose more problems.



## Adding and Subtracting Fractions with Unlike Denominators

Read *Picture Pie* by Ed Emberley

Cut circles to make fractional parts and create fraction art. If a circle is a whole, what is the value of your art?



### What is the value of the fish?



$$\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \frac{5}{8}$$



$$\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{4} + \frac{1}{4} = n$$

$$\frac{3}{8} + \frac{2}{4} = n$$

Could you think about it or model it as eighths?

$$\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{2}{8} + \frac{2}{8} = n$$



## Can we build mathematical thinkers by telling students how to do fraction procedures?

- Context – to connect the abstract fractions and procedures to real life
- Varied Models – to visualize and make sense of the concepts and procedures
- Math talk – to discuss, consider, and refine their thinking
- Interactive Practice – to test their thinking and continue the learning

Step back and let them do the thinking!

## Resource for Center Tasks to Develop a Deep Understanding of Numbers:

### Navigating Numeracy Learning Progression Centers (hand2mind, 2024)

[www.hand2mind.com/navigating-numeracy](http://www.hand2mind.com/navigating-numeracy)

*Navigating Numeracy* center kits contain grade-specific, hands-on, and interactive practice opportunities that guide K-5 students toward a deep understanding of numbers. Each kit contains 45 repeatable centers that span the number skills you teach across the school year. The tasks are engaging and focus on the critical number skills that are a priority in our math standards. Each kit contains a teacher's guide, student task cards, game boards, spinners, game cards, and manipulatives so students can explore the skills through hands-on tasks.

For more ideas and resources, see Sue's website: [www.qualityteacherdevelopment.com](http://www.qualityteacherdevelopment.com)

Join our Facebook group: <https://www.facebook.com/groups/MathinPractice>

## More Teacher Resource Books by Sue O'Connell

### ***Math by the Book* (Heinemann, 2021)**

This k-5 series shows ways to teach mathematics through the context of children's literature. It is filled with lessons that show the power of teaching mathematics through models and math talk. It includes games to practice the math skills, word problems, and lots of talk/writing prompts, along with online resources and video coaching. To learn more, or to download a list of children's literature, visit the website at [www.mathbythebook.com](http://www.mathbythebook.com).

### ***Math in Practice* (www.mathinpractice.com)**

This series is filled with lesson ideas, instructional strategies, practice tasks, and many online printable resources to make teaching K-5 math more meaningful and more fun. There is a book for each grade level K-5 that contains a wealth of grade-specific activities, as well as a *Guide for Teachers* filled with instructional strategies to support greater understanding of math concepts. A *Guide for Administrators* offers tips and strategies for math coaches/administrators. Visit the website at [www.mathinpractice.com](http://www.mathinpractice.com) to view samplers, see videos, and learn more about the series.

### ***Mastering the Basic Math Facts for Addition and Subtraction***

### ***Mastering the Basic Math Facts for Multiplication and Division***

with John SanGiovanni

Through investigations, discussions, visual models, children's literature, and hands-on explorations, students explore the math operations, and through engaging, interactive practice achieve fluency with basic facts. A teacher-friendly CD filled with customizable activities, templates, recording sheets, and teacher tools simplifies your planning and preparation. The online resources include over 450 pages of reproducible forms/games which can be downloaded in English and Spanish translation.

For more ideas:

Follow Sue on Twitter @SueOConnellMath

Or visit Sue's website at: [www.qualityteacherdevelopment.com](http://www.qualityteacherdevelopment.com)